Environmental Assessment

To Accompany the

Keweenaw National Historical Park

Fire Management Plan

May, 2003

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Chapter 1 -- Introduction

Site Description

Keweenaw National Historical Park (park) is both a physical place and a concept that challenges our traditional notions of national parks. It embraces a region of the Upper Peninsula of Michigan known for its copper mining history. It demonstrates a new concept in National Park Service (NPS) facilities by utilizing cooperative agreements with state and local governments, citizens' groups, businesses, and individuals, as well as a small amount of federally owned property. Two principle districts make up the park, the Quincy Mining Company Historic District (Quincy Unit) and the Calumet Historic District (Calumet Unit). Both areas are historic landmarks designated in 1989. Congress passed Public Law 102-543 in October of 1992 establishing the Keweenaw National Historical Park. Park boundaries have not been finalized and remain subject to modification with current planning based on descriptions published in the Federal Register on November 24, 1993.

There are two units within the park. Eleven miles separate the units. The park manages federally owned properties within each unit. The 750-acre Calumet Unit houses the park offices within an historic industrial complex in Calumet Township, adjacent to the Village of Calumet. NPS lands comprise seven parcels totaling 8 acres. Ground surveys have also been completed for the Calumet Unit parcels.

The Quincy Unit federal land consists of third growth native, ornamental, and exotic vegetation as well as four smaller parcels of vacant and developed land totaling 34 acres, which includes historic structures, ruins, and a telecommunications tower right-of-way. Principle attention is given to the wildland within the Quincy Unit in this document.

The Quincy Unit encompasses 1,120 acres of land northeast of Hancock, Michigan, and adjacent to Portage Lake. The unit includes the remnant structures and mines of the Quincy Mining Company and its associated landscape. The Quincy company operations stretched northeast to southwest along the hill above Portage Lake and the city of Hancock. The 104 acres of federal land within this unit recently belonged to the Quincy Mining Company and are located on the west side of Highway US-41 between the southwest corner of section 24, Franklin Township, Houghton County, and Pontiac Road in the northeast portion of the same section (Fig. 1). Lake Annie Road divides 6± acres with portions of an unincorporated settlement called Franklin, from the remaining 98± acres north of the road. A privately owned 10.1-acre parcel within the 98± acres forms a narrow rectangle along US-41 and extends northwest. US-41 borders the land on its eastern border and at least nine private owners have parcels along the remaining borders. The historic settlement of Franklin still has several private residences, although much of the original settlement is in the federal holdings. The park has not done a ground survey of the 104-acre parcel to establish the physical borders. A ground survey has been completed for the Quincy Mining Company Pay Office parcel.

Mission Statement

The mission of Keweenaw National Historical Park is to preserve, protect, and interpret the natural and cultural resources relating to the copper mining industry for the enjoyment and benefit of current and future generations through cooperative efforts and partnerships with state and local governments, public and private entities.

Historical Significance

The significance of the park is the story of copper and its relation to the development of an industrialized society in the United States. The Keweenaw embodies a unique geologic occurrence of pure elemental copper and contains remnants of the oldest known metal mining activities in the western hemisphere. The Calumet and Quincy Units represent the longest duration, greatest production, and most technologically innovative examples of copper mining in America. Both sites attracted a rich diversity of immigrants.

Significance Statement

The park contains many cultural resources that are important to the historic scene and to the story of copper. Many will be lost if they do not receive protection. This park is one of a new generation that is not based on federal land acquisition, but rather on cooperative agreements with private and other non-federal entities dedicated to the preservation and interpretation of history on the Keweenaw Peninsula. The General Management Plan (GMP) preferred alternative combines a strong presence of the NPS in the park units with community assistance in a well organized cooperative venture to protect and interpret resources, while providing the optimum opportunity for high-quality visitor experiences.

The park's cooperative partnerships are an attempt to protect the experience of place. The memories and senses attached to this very special place capture the essence of our nation's accomplishments and development into an industrial and economic power.

Purpose

The park maintains lands that are capable of burning and therefore must develop a fire management plan. This environmental assessment is necessary to determine the appropriate strategy and tools to manage fire occurrence and hazard fuels. Impacts of several management techniques will be evaluated in this document based on data available and the expertise of cultural and natural resource specialists from the park, region, and other agencies and institutions.

The park is charged with preserving and interpreting historic resources, which includes protecting resources from the detrimental effects of fire. The GMP has chosen an alternative for future desired conditions and planning that is purposely broad to allow flexibility over the many years of implementation in this new park. A Fire Management Plan (FMP) must also be flexible to meet the changing needs of the park as it develops resource management plans.

Need for Fire Management Plan and Environmental Assessment

National Park Service's Director's Order #18 requires that

> *"All NPS units with vegetation that can sustain fire must have a Fire Management Plan."*

It further states that,

> *"The overall resource management objectives for an NPS unit must guide Fire Management Plans. The resource management objectives will determine whether and how fire will be managed."*

To ensure that protocols described in the FMP will not have adverse effects on natural and cultural resources, Director's Order #18 requires that the FMP be compliant with the National Environmental Policy Act (NEPA). The environmental assessment (EA) functions as the NEPA documentation for analysis of a range of reasonable, short-term management alternatives, and their direct, indirect, and cumulative impacts. In the case of this park, the list of reasonable alternatives is extremely short, because the Interdisciplinary Team considered alternatives with predictable outcomes to be "reasonable." Little data exists for this land. The land was recently acquired, desired future conditions have not been established, and inventories of resources have not been conducted, making determination of potential impacts and outcomes difficult. Despite the lack of data, Director's Order #18 requires fire management guidance based on the best information available. Therefore, the Interdisciplinary Team chose alternatives that they could reasonably assume would meet the primary fire management objective of reducing the risk of unwanted wildland fire.

The Federal Wildland Fire Policy of 1996 states,

> *"Wildland/urban interface protection is important to the Federal government because federally managed lands are located adjacent to or among State lands and developed private lands. Past fire management practices have contributed to a build-up of highly flammable, decadent fuels on those Federal lands that are adjacent to private residential developments."*

The NPS has implemented programs under the President's Fire Initiative (known as the National Fire Plan of 2000). The National Fire Plan of 2000 addresses wildland fire management in two goals that apply directly to the park stated goals.

- Reduce hazard fuels in high-risk areas to protect communities
- Reduce hazard fuels in high-risk areas to protect natural and cultural resources and maintain ecosystem functions

The first goal is often referred to as hazard reduction at the wildland urban interface. The second goal implies that fuels will be treated in a manner that maintains or benefits natural processes. Alternatives for fire management must reasonably satisfy these goals.

Fire Management Objectives

Fire management objectives reflect support for the principle mission of the park and its emphasis on interpretation of the period of significance. The park wishes to consider techniques that would

- Mitigate hazardous fuel conditions in the wooded areas as needed, so as to reduce the likelihood of undesirable or unwanted wildland fire, and to protect human life and property both within and adjacent to the park;
- Use, whenever practicable, natural processes in the management of natural resources; and
- Protect natural and cultural resources from detrimental impacts of unwanted or undesirable wildland fire or fire management activities.

Fire management programs are designed to meet resource management objectives (NPS Management Policies 1988), but at this time, the park has not formulated management objectives for cultural and natural resources that could be managed with fire. Therefore, hazardous condition management is the only objective for fire management planning beyond suppression guidance. Hazard fuel treatment, use of natural processes, and wildland fire protection do not apply to the Calumet Unit federal lands, since they are part of an urban setting without any wildland. The desired landscape is maintained using standard urban landscaping techniques, such as mowing and trimming with refuse disposal. Therefore, the Calumet Unit will not be considered further within this EA. The Quincy Unit is undeveloped and will be included in this EA.

Scoping Issues and Impact Topics

Issues describe the relationships between proposed actions and the environmental resources. Issues lead to the development of impact topics that receive attention in the environmental consequences portion of analysis. Impacts are predictable results of the action on the impact topics and they are quantified as much as possible within this document. Scoping for the range of potential issues for the park occurred on April 10, 2003. Principle issues identified in the scoping included:

- Unwanted wildland fire could damage existing remnants of buildings, particularly those with remaining wood structure.
- Fire suppression activities could damage unknown archaeological features.
- The park has not inventoried cultural or natural resources on federal land, or developed resource management plans; therefore, desired future conditions for specific resources must be inferred from the GMP.
- Unwanted wildland fire could impact neighbors and will be prevented if at all possible.

Natural resource issues address both structure and function, such that processes and physical components are considered part of the ecosystem. Subsequent topics considered for inclusion in the EA included geology and soils, water resources and wetlands, air quality, vegetation, fauna and habitat, and rare, threatened, and endangered species. No unique natural resources or ecologically critical areas are identified for the park. Cultural resource topics usually address archaeology, cultural landscape, and historic fabric of a park. The Quincy Unit federal land is within the Quincy Mining Company National Historic Landmark District, and contains remnant structures important to the integrity of the park. The Quincy Mining Company Pay Office, which houses the George Wright Society, Isle Royale Natural History Association, and Isle Royale National Park offices, and archaeological remnants constitute the extant historic fabric in the unit. Fire management must consider the impact of hazard fuel mitigation, a No Action alternative, and wildland fire suppression on these resources.

The proposed alternatives may complement the cultural landscape goal to maintain a representative landscape. That landscape has not been well defined in the only existing park planning document, the GMP. The Quincy Unit landscape has not been inventoried nor had desired future conditions identified. Therefore, the current cultural landscape goal will be to maintain a landscape that represents the natural reclamation of a once developed and industrialized area. Both of the alternatives are consistent with this goal. This broad goal is separate from the fire management objective and will receive no further analysis in this document.

Human health and safety constitute the overlying reason for developing a fire management strategy. This assessment takes into consideration all aspects of human health and safety, but will address this topic implicitly as it relates to the fire management objective. Impacts to natural resources indirectly affect health and safety. Air quality is second only to physical safety during a fire, when considering health and safety. Therefore, since only trained and certified fire fighters would participate in burning, all remaining health and safety issues will be addressed within other discussion topics.

Issues and Impact Topics Considered but Not Addressed in this EA

Water Resources and Wetlands

Although wetlands occur on the northeast portion of the 104-acre parcel and an ephemeral stream runs through this portion (Fig. 2), the stated alternatives have no direct, indirect, or cumulative measurable impacts on water resources and wetlands. Neither of the hazard fuel treatments would occur within wetlands. The only potential for impact relates to fire suppression activities. Every effort would be made during fire suppression to minimize disturbances to wetlands. No filling, changes in elevation, or changes in hydrology are expected from any treatment or fire suppression. Firefighters would use Minimum Impact Suppression Tactics (MIST) at all times, further

protecting wetlands from impact. Therefore, this impact topic will not be discussed further in this analysis.

Fauna and Habitat

The principle impacts of fire on fauna are through alteration of habitat (Lyons, et al. 1997). Because the alternatives have no impact on the elements of habitat (food, water, shelter, space), no substantive impacts can be expected on fauna or their habitat.

Rare, Threatened, and Endangered Species

At this time, no federally listed species are known to exist in the park. One state species of concern, Douglas hawthorn (*Crataegus douglasii*), may occur on site. This small tree would not receive treatment under any of the alternatives. Its occurrence on the land is sparse, if it occurs at all. For this reason, this topic was dropped from further discussion.

Cultural Landscape

No extant cultural landscape has been designated at this disturbed site and no desired future conditions for cultural landscape have been identified. The current strategy is to allow reclamation of the landscape through succession. The alternatives would not impact this process. Therefore, this topic has been dropped from further discussion.

Visitor Experience

The park does not currently promote or encourage visitation in the newly acquired Quincy Unit property. No interpretive programs are specific to the parcel. The parcel was purchased to encourage landscape compatible with the desired views of the Quincy area. Because the park is a cooperative venture between federal and private concerns, the park must protect the visitor experience at participating locations. The federal land is separated from visitation areas for the Quincy Mine, the closest partner. The land is visible along the US Highway-41 corridor of the Quincy Unit, and so passing travelers and potential visitors may note management activities along the roadside, but neither of the alternatives would impact the visitor experience along the quarter mile stretch of high speed highway.

The Quincy Unit was purchased, in part, to retain the viewshed surrounding the Quincy Mine, when viewed from across the Portage Canal. The park wished to promote a setting without modern development around the mine and avoid disturbance to the aesthetics of the hill top. Hazard mitigation will have no impact on the visual effect of this unit, as seen from across Portage Canal. Wildland fire will not interfere with the intended effect, either. Therefore, the visual impact did not merit further discussion in visitor experience impacts.

Ethnography

The Quincy Unit has been greatly altered from its pre-settlement landscape and uses. The area, as with most of the Keweenaw, had been timbered and mining communities

dotted the land. These communities were similar to our industrialized sections of current cities. The Quincy Unit does not appear to have great cultural significance to traditional people or the area. The unit became a center of culture for immigrant people from mining traditions in Europe. It is arguable that a purpose of the park is to preserve the ethnographic resources from the mining era. Therefore, known or suspected ethnographic resources will be preserved as a part of the park mission. The Ojibwa of the Keweenaw Bay Indian Community have been consulted about any ethnographic resources associated with the Ojibwa traditions that are unknown by the park. The park has not identified any impacts that any of the alternatives may have on ethnographic resources. Therefore, ethnographic impacts will not be further addressed in this document, since there is no known impact from any alternative.

Socioeconomics

The park has a potentially positive impact on socioeconomic resources of the area by providing an additional draw of tourists to the region. Houghton and Keweenaw counties have been economically depressed since the closure of the mines and reduction in timbering industry. Overall park impact on the economy is broadly based on increased tourism, and fire management activities will not affect it.

The park may contract mechanical treatments to a private company, but the contract would be relatively small and not impact local economics. The alternatives proposed here would not have impact on the economics of the region or immediate vicinity. Therefore, socioeconomic impacts will not be further discussed in this document.

Environmental Justice and Protection of Children

Socioeconomic issues include environmental justice (Executive Order 12898) and economic impacts on surrounding private holdings. The alternatives have no substantive effect on socioeconomic issues and no disproportionately high and adverse human health or environmental effects would exist for minorities and low-income populations. Therefore, this topic was dropped from further discussion.

Costs

Although costs will not be addressed as a separate topic, it is included for consideration in cumulative impacts of environmental consequences. Labor is the principle cost associated with Alternative B. Costs are expected to be minimal, since treatment would be infrequent and of small scale. Therefore, this issue is briefly discussed in cumulative impacts, since it is recurring, but is not addressed as a unique topic.

Chapter 2 -- Alternatives

This chapter describes the range of alternatives, including the No Action alternative. Alternatives were selected based on their feasibility and reasonability in meeting the park fire management objective and consistency with natural or cultural resource goals where linked to fire management. No natural resource management objectives were

identified. Therefore, the effectiveness of the alternatives in managing hazardous conditions, using natural processes, to protect resources will be considered.

The responsibility of the park to preserve and protect cultural resources in a wildland urban interface setting necessitates suppression of all undesirable wildland fire. During fire suppression, fire crews would employ Minimum Impact Suppression Tactics, MIST (NPS Reference Manual 18) at all times. Additional fire breaks would not be added to the parcel, since it is surrounded by roads, cleared land, and water. The Quincy-Franklin-Hancock Townships Fire Department and Calumet Fire & Rescue, local rural volunteer departments provide emergency fire suppression on the park lands. The park does not have its own fire suppression equipment or crew. For the purpose of fire suppression, the park will participate in an existing mutual aid agreement between townships, municipalities, and the Michigan Department of Natural Resources.

Alternative A -- No Action

This alternative represents the status quo for hazard fuel management, but allows for the development of fire management guidance. No management has been applied to the Quincy Unit federal lands. This alternative does not provide for hazard reduction. Planning for the occurrence of unwanted wildland fire and long-term management of natural resources are basic protection goals established in the Government Performance and Results Act of 1993, Director's Order #18, and the Organic Act. An FMP using the no action alternative would focus on fire suppression.

Crews responding to wildland fire would use MIST at all times to minimize the impacts to cultural and natural resources. Unfortunately, the principle responders to unwanted wildland fire at the park may not have MIST training and respond most frequently to structural fire. Firefighters would rely on existing fire breaks to contain undesirable wildland fire without additional fire lines when feasible. Fire fighters may backfire from existing lines to improve the fire line, but they would avoid soil disturbance.

Alternative B – Hazard Fuel Mitigation

Land would be assessed for hazard fuel conditions annually. Laborers with chainsaws and hand tools could remove hazard fuels as needed. Laborers could trim branches from red pine (*Pinus resinosa*) in the plantation to a level of 12 to 15 feet above the ground. Laborers could cut dead limbs and trees in the hardwoods if they posed a hazard. Snags that do not contribute to hazard fuels could be left standing. Dead limbs could be cut from open grown white cedars as needed, although soil moisture and sparse vegetation may reduce the need for treatment. No treatment would occur in the tag alder swamp or cedar swamp. These areas have sparse vegetation on saturated soils with standing water during much of the year.

This alternative allows for on-site debris disposal through several methods. A fire or resource manager would designate the locations and disposition for debris. Fuels could

be allowed to remain at the original location. This could be useful when conditions could carry fire into the canopy, but no hazard exists at the ground level. If hazard conditions exist on the ground, debris may be removed from the original location and scattered elsewhere in locations without hazard conditions. When conditions exist that necessitate removal and disposal of hazard fuels, they could be dragged to vehicle access points. Access points exist at several locations along US Highway-41 and some may be located along the streetcar grade, abandoned logging access or power line right-of-way (Fig. 2 and Fig. 3). Debris could be disposed of in a landscape waste facility off-site, or through several on-site methods.

On-site debris disposal includes chipping with dispersal, chipping and composting, and burning. Wood chips could be used to cover trails or other landscape features. They could be distributed broadly to decompose naturally. Compost piles could be created in areas where they would not become hazards. Compost turning would not be necessary, but would expedite decomposition. Compost could be used in park projects or redistributed in areas where soil has poor organic content. A trained and certified fire crew could assist in open burning small piles of woody debris. Piles would be kept small to control fire intensity and to avoid scorching soils. Ignition could occur if/when winds were favorable to keep smoke away from populated areas and the highway. Ash could be redistributed as practicable. Burn piles would be rotated to different locations for each disposal event to minimize soil damage from scorching and to maximize distribution of nutrients in ash. Judgment would be made on-the-ground in choosing the method of fuel disposition based on potential for creating hazard fuel conditions in the piling, composting, and distribution areas, and environmental conditions for burning debris.

Effectively managing hazard fuels would reduce the potential for unwanted wildland fire. Should wildland fire occur, it would be met with immediate suppression, and MIST would be used at all times. Disturbance to soils and potential archaeological features would be minimized during treatment and wildland fire suppression. No additional fire breaks would be added for wildland fire suppression.

Alternatives Considered and Not Further Addressed in this EA

The first alternative considered was the No Action/No Guidance alternative. This is the actual current state at the park, because the land acquisition is so recent and no resource management plans exist. This alternative is not reasonable, since it violates Director’s Order #18, in that it makes no provision for developing fire management guidance. Both the No Action/No Guidance and the No Action alternatives neglect any proactive hazard fuel management. The No Action/No Guidance alternative appears similar to the No Action alternative, except that the No Action alternative provides guidance for fire suppression through a fire management plan. Because Director’s Order #18 requires fire management guidance, the No Action/No Guidance alternative is not reasonable and was dropped from consideration.

Prescribed fire treatment was discussed during scoping, but was rejected as an alternative because it is not reasonable for attaining the stated objective. Fire was not part of the landscape during the period of significance and was met by suppression. Disturbance of land and vegetation and subsequent fire suppression resulted in a vegetation mosaic that is not fire-dependent. Natural red pine forest would have experienced periodic fire and the species is fire-adapted. The current red pine plantation does not mimic a natural stand and is best treated by limb pruning to 15 feet in height. The reclaimed residential area with lilacs and apples has a ground cover of cool season grass. The grasses, apple trees, and lilac bushes, relics of the period of significance and an example of a representative landscape, would succumb to fire treatment. The remaining mosaic of woods and grassy areas contain many species that are native to the area, but not fire-dependent. Broadcast prescribed fire would not achieve desired landscape results of permitting natural succession, and so will not be further considered in this document.

The Environmentally Preferred Alternative

The Council on Environmental Quality (CEQ) regulations (40CFR 1500-1508) and Director's Order #12 require NPS to identify the alternative that best promotes the goals of section 101 of the NEPA. The CEQ defines the environmentally preferred alternative as

> *". . . the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (1981)*

The environmentally preferred alternative is the combined use of hazard fuel mitigation, Alternative B. This alternative best meets the park objective with the least disturbance to the environment. It uses natural processes of decomposition and occasional fire to dispose of debris and return nutrients to the soil. During most of the period of significance, the landscape was significantly altered and natural processes were interrupted. Reclamation of the land occurs most effectively when natural processes are allowed to proceed. Perhaps most importantly, Alternative B allows the park more options for adaptive management based on current conditions and desired future conditions. This includes using the most practical means of disposal for debris.

The No Action alternative does not allow any use of hazard fuel treatment. Neither of the proposed alternatives would result in substantive impacts or impairment.

Chapter 3 -- Affected Environment

This chapter describes the conditions that exist at the park. It describes the portion of the environment that may be affected by the proposed action and alternative actions. It does not describe aspects of the park that are not affected by the actions. Although the park boundaries include private property, as well as the federally owned land, only the Quincy Unit federal parcel is under consideration for treatment. For purposes of clarity, the word "parcel" will refer to land and its ownership and the word "border"

will refer to the bounding lines of a parcel. The word “boundary” is reserved for the park boundary, which includes both the greater Calumet and Quincy Units.

Natural Resources

The park has not completed inventories of its natural resources on the 104- acre parcel of the Quincy Unit. The border is generally known, but a ground survey has not marked the federal land borders. The Interdisciplinary Team has examined the land as described within the borders and made a visual assessment of resources apparent. A vegetation map (Fig. 3) approximates the vegetation cover on the land. Location of wetlands is shown in Figure 2, but current ground work indicates additional wet ground, in part created by road grades, as indicated in Figure 3 and Figure 4.

Geology and Soils

Soils are mostly Net-Witbeck complex with other complexes consisting of Trimountain, Paavola, Waiska, and Michigamme, overlying basalt bedrock. Soils are generally deep and poorly drained with some moderately well-drained areas. Although the surface has good permeability and consists of organic material, subsoil layers are either firmly packed or retain a high, perched water table. Sandy loam comprises most of the subsoil, but different consistencies dictate varying drainage and water capacity. These soils make good woodlands, but the high water table can lead to shallow root structure and windthrow problems. These soils are susceptible to damage from vehicles, when they are water saturated.

Air Quality

The Michigan Department of Environmental Quality classifies air quality areas in priorities I and II. Houghton County is not listed in either priority class, indicating that no air quality concerns exist. Air quality is generally good with few sources of pollution within 50 miles of the park. Air pollution sources typical of this area include paper mills, light industry, and internal combustion engines. Mobile air pollution sources, particularly diesel engines, contribute over 60% of the pollutants. The county is ranked among the cleanest 20% of counties in the country in terms hazardous air pollution that can cause cancer in humans (www.scorecard.org, based on EPA data). This area attracts tourists because of the clean air, clean water, and lack of development.

The state of Michigan enforces regulations concerning open burning. Tree, log, brush, and stump burning is allowed under permit, if consistent with local ordinance and not conducted within a priority I or II area (Natural Resources and Environmental Protection Act, 1994, PA 451, R336.1331, R336.1310). Burning cannot be closer than 1400 feet to an incorporated city or village limit. Burning is allowed without permit any time the ground is snow covered, and is permitted by the Department of Natural Resources at other times, unless extreme conditions exist (see attached Open Burning Regulations).

Vegetation

The vegetation of the treatment area consists of highly disturbed community with succession reclaiming cleared land and some that was once residential. A red pine (*Pinus resinosa*) plantation with trees of approximately 30 - 40 feet height exists on the west side of the parcel and is planted according to traditional methods for timber production. The remaining cover consists of white cedar (*Thuja occidentalis*), a few black spruce (*Picea mariana*), and mixed deciduous trees (Fig. 3, Table 2). Some open-grown oaks (*Quercus macrocarpa, Q. rubra.*) are surrounded by small hardwoods. Sugar maple (*Acer saccharum*) is succeeding under trembling aspen (*Populus tremuloides*) and paper birch (*Betula papyrifera*) in many locations. The road and streetcar grades behave as dams, retaining water between grade and Hwy. US-41. Moist soils exclude some hardwood species at many locations and white cedar, scrub trees, and in some cases, red osier dogwood (C*ornus stolonifera*) dominate the cover. Tag alder (*Alnus incana*; Symons and Merwin 1963) persists in one wet area of approximately ten acres near the middle of the parcel. The species are generally not fire-dependent, with the exception of the few open grown oaks.

Cultural Resources

Archaeology

No archaeological surveys have been conducted on this parcel. Three remnants of buildings from the period of significance remain in the southern portion of the property (Fig. 3). The remains consist mainly of stone and brick foundations with pieces of old construction-lumber scattered in the vicinities. Material archaeology associated with residential areas and light industry is likely on site, particularly in the vicinity of foundations. Materials consistent with an urban setting and located within the top two inches of soil horizon would be susceptible to heat damage if intense fire burned at the soil surface. These materials may include glass, metal, and clay artifacts of the period of significance. They may lie at the surface or just below the soil surface. Foundations and the soil surface around the foundations are considered archaeologically sensitive areas (Jeff Richner, personal communication).

The grade for the Houghton County Traction Company runs parallel to Hwy. US-41 for most of the length of the property. The original grade meets other road grades in the northern section of the parcel and continuity of the original grade becomes lost to casual observation.

Table 1: Matrix of effectiveness and impacts of each alternative

Objective	Alternative A No Action	Alternative B Hazard Fuel Mitigation
Hazard fuel management	Effectiveness is unknown	Effective, allows for on-the-ground decisions
Resources		
Geology and Soils	No impact	No indirect, direct or cumulative impact, mitigated
Air quality	No impact	Negligible, temporary, localized (smoke; exhaust)
Vegetation	No impact	Beneficial impact
Archaeology	No impact	No indirect, direct or cumulative impact, mitigated
Cumulative impacts	No impact	No indirect, direct or cumulative impact, mitigated
Conclusions	No impact; effectiveness in hazard mitigation is unknown.	No substantive indirect, direct or cumulative impact; effective in reducing the probability of wildland fire and its impacts.

Definition of impact intensity

- Negligible – minimal or no impact, change not detectable.
- Minor – change in resource area occurs, but no substantial resource impact results; effect is localized and slightly detectable.
- Moderate – Impact is sufficient to cause a change in a character defining feature, but integrity of the resource remains intact.
- Major – Impact results in substantive and noticeable change in character defining features (more than one); effect is easily defined, noticeable, and measurable.

Definition of duration

- Temporary – impacts simultaneous with action or activity; once action has ended, resource conditions are likely to return to pre-activity conditions.
- Short-term – impact would extend beyond activity or action, but would last at most a couple of years.

Definition of extent

- Localized – Impact would affect the resource only at the site of management action or its immediate surroundings.

- Regional – Impact would affect the resource extending well past the immediate location of action and spreading into substantial portions of the park and/or beyond its boundary.

Chapter 4 -- Environmental Consequences

Analysis of impacts is based on the predicted ability of each alternative to achieve the desired goal of hazard fuel management with minimal negative direct, indirect, and cumulative impacts to park resources and surrounding environment. Analysis takes into account human health and safety issues as being of paramount importance. It will identify both negative and positive impacts of the alternatives to the resources and to factors not specifically addressed in the management goals. The NPS and other agency/organization experts on resource issues for this region were consulted whenever possible, so as to make discussions of possible impacts relevant to the park.

Impacts are judged by their intensity, duration, and overall extent as defined in the preceding section. All three criteria become part of the consideration of "impairment." The NPS Management Policies 2001, section 1.4, stipulates that managers must determine whether the proposed actions would impair park resources. Impairment occurs when in the professional judgment of a resource manager the integrity of resources and values would be harmed. This could happen if (1) a value specific to the enabling legislation, (2) the natural or cultural integrity, (3) opportunities to enjoy resources or values, or (4) a goal in park management plans is compromised. Management has the discretion to allow impacts to park resources in the fulfillment of the facility's purpose as long as the impact does not constitute impairment of affected resources and values. Impairment has been considered in the discussion of environmental consequences and will be summarized at the end.

Natural Resources

Geology and Soils

Alternative A -- No Action

The current methods of management would not appreciably impact the condition or quality of soils or natural soil genesis. Wildland fire has the potential of damaging soils with intense heat. Standard policy concentrates on suppression rather than mitigation of hazard fuels. Wildland fire suppression, even with deployment of MIST, can result in soil disturbance. Equipment can cause deep rutting that could expose tree roots and alter soil structure. Although the incidence of fire resulting from hazard fuel conditions is expected to be low, wildland fire has greater probability of occurring when no hazard mitigation program exists.

Alternative B – Hazard Fuel Mitigation

This alternative allows a small amount of nutrient recycling by returning nutrients to the soil through the distribution of ash and compost. Organic matter would be added to the soil at times when unburned materials are left to decompose. Composted organic material amends soils, creating conditions that balance moisture retention, porosity, and nutrients. The addition of compost would benefit the disturbed soils of this area by returning organic material and nutrients that have been lost since pre-settlement times.

There may be rare occasions when hazard fuels are removed from their point of origin. Hazard fuel conditions would exist in this climate only after many years of material accumulation, if at all (Martin F. Jurgensen, written communication). This would require infrequent removal of fuels. Between treatments for hazard conditions, plant material could remain and contribute to surface fertility, eliminating the impacts of occasional material removal.

Burning debris piles under this alternative have the potential to scorch soil and cause soil sterility. To mitigate this, burn piles would be kept small to control intensity and would be rotated to different locations with each burn. Taking the precautions described would result in no impacts to soils and geology.

Using a treatment that effectively reduces the potential of wildland fire minimizes the potential for impact on soils. Reducing the probability of unwanted wildland fire, reduces the risk associated with intense fire and fire suppression activities. Use of equipment on these soils can result in rutting when soils are water saturated. Deep rutting could expose tree roots and alter soil structure.

Summary of Impacts

Although neither of the alternatives would substantively impact soils, Alternative B may best meet the objective while best protecting and benefiting soils. Under Alternative B, care must be taken that burn piles do not burn too hot and scorch soil. The use of vehicles can cause soil compaction and disturbance, such as rutting. Use of equipment on these soils must be restricted in spring and other wet periods (USDA 1991). Vehicles should be kept to established paths, roads and grades, and turn-outs when possible. Treatment could be infrequent, allowing natural processes to continue without interference.

Fire suppression may result in minor soil movement, rutting, and compaction in localized areas, but the soils would recover. The use of MIST would minimize the impacts of suppression and ensure that suppression affected resources less than unwanted wildland fire affected resources. The area of potential wildland fire is surrounded by barriers that limit the extent of fire. Hard surfaces, power transmission lines with cleared vegetation, and water help to form fire barriers and reduce the need for fire lines (Fig. 3 and Fig. 4). No additional pre-suppression fire breaks would be added to the land.

Unwanted wildland fire burns with great intensity and has the potential for altering soils, particularly the organic and duff layer at the surface. Similarly, wildland fire suppression can damage soils by disturbing the matrix through digging lines and running equipment through fragile soils. Hazard fuel treatment is important to reducing the potential for unwanted wildland fire and very necessary to protecting resources. This suggests that Alternative B could provide better protection for soils than Alternative A. Firefighters would utilize MIST to minimize damage to resources. No impairment would occur under either proposed alternative or wildland fire suppression.

Air Quality

Alternative A -- No Action

Without hazard mitigation, wildland fire has greater potential for igniting and reducing air quality than with hazard mitigation.

Alternative B – Hazard Fuel Mitigation

The use of chainsaws, weed whackers, and vehicles for hauling debris could cause temporary presence of exhaust fumes in localized areas. The amount released is far less than the exhaust released by traffic on Hwy. US-41. The amount is small and temporary and will not be cumulative with exhaust from the highway.

Impacts to air quality from burn piles would be localized and temporary, dissipating within minutes of extinguishing a fire. No population centers occur adjacent the parcel, although Hwy. US-41 borders the east side of the unit, making direction of smoke critical to human safety. Smoke from burn piles creates a temporary decrease in air quality and visibility in the vicinity of the fire. Fires would be placed strategically to avoid smoke on the highway and would be ignited only if conditions would not allow smoke to obstruct visibility. The ability to redistribute fuels could serve to minimize the temporary effects of burn piles.

Burning of piles might also impact health and safety. Tests have shown that burning of land-clearing debris, primarily wood and other organic material, releases a large number of pollutants including carbon monoxide, PM_{10}, $PM_{2.5}$, benzene, acetone, toluene, ethyl benzene, pinene, naphthalene, phenol, and 14 polycyclic aromatic hydrocarbons (Lutes and Kariher, 1997). Although concentrations of the compounds are very low, particulate matter (PM_{10}, $PM_{2.5}$) is a significant component of smoke. A hospital and a school are located within two miles of the parcel. The park would inform these institutions prior to burn pile ignition and will take necessary measures to ensure that smoke does not affect either institution.

Composting allows the release of carbon dioxide as with natural decomposition. Because this is a natural process, it cannot be considered a local impact.

Hazard fuels would always be properly disposed, reducing the chances of unwanted wildland fire. Wildland fire could result in greater impacts on air quality than proposed treatments. The total addition of particulate and chemical load to the air during treatment is expected to be negligible and smoke production and direction can be controlled, such that there are negligible impacts in the vicinity. No substantive long-term or cumulative impacts from this alternative are predicted.

Summary of Impacts

Neither of the alternatives would have a substantive impact on air quality. The small amounts of exhaust produced during treatment cannot be considered cumulative with the adjacent exhaust from the highway, since the duration of this impact is temporary and recurrence very infrequent (once in five to ten years).

Any use of fire must consider the path smoke would take. Having little development on the park borders helps to ensure that smoke would not adversely impact neighbors. Any reduction in air quality would be temporary, since the small amount of smoke would disperse quickly. Fire suppression may result in temporary smoke from back fires and exhaust from internal combustion engines. Both impacts are minor and temporary.

In contrast, unwanted wildland fire could result in long duration fires of high intensity, resulting in substantial smoke. The best control of hazard fuel conditions does the most to protect air quality. This suggests that a program of hazard fuel mitigation, Alternative B, would best protect air quality in the long-term. No cumulative impacts or impairment would occur under either proposed alternative or wildland fire suppression.

Vegetation

Alternative A

Wildland fire, in the absence of hazard fuel mitigation, has the potential for affecting vegetation substantively.

Alternative B – Hazard Fuel Mitigation

Treatments that may be applied to the vegetation are intended to manage hazard fuels. Treatment involves alteration of vegetation and so must be considered as an impact, as well as the objective in treatment. This impact is not adverse, but rather, benefits the vegetation by reducing the risk and detrimental effects of wildland fire. During hazard fuel mitigation, dead fuels and some living vegetation may be removed or redistributed. The overall impact on the plant community would be negligible. Sometimes treatment may result in a reduction in plant competition that is beneficial to the plant community. This disturbed site does not contain a fragile ecosystem, although one species of concern, Douglas hawthorn *(Crataegus douglasii)* is suspected to occur. Hazard fuel treatment would occur only as needed and experts feel that treatment would occur infrequently (once every five to ten years or less often). The impacts of infrequent treatment are far less than those of unwanted wildland fire.

Alternative B recommends trimming low branches within the red pine plantation. The plantation is designed for silvicultural purposes and does not resemble a natural plant community. Tree trimming is regarded as proper maintenance and forestry practice within red pine plantations and should have beneficial impacts. Few plants grow in the understory within the plantation, so no adverse impacts are expected in the understory.

Wildland fire suppression would have negligible impact on this highly disturbed vegetation, relative to the impact of the unwanted wildland fire itself. Impacts from suppression would be short-term and localized. No impairment would occur under any proposed alternative or wildland fire suppression.

Summary of Impacts

Neither alternative would result in substantive impacts to vegetation. Alternative B has a positive impact on vegetation by improving the red pine plantation and altering the vegetation so as to reduce the hazard of unwanted wildland fire. The vegetation is in the process of recovery from a period of disturbance that lasted about 75 years. Hazard mitigation may become part of the recovery in this landscape, which is not fire dependent. Since wildland fire burns intensely and can damage the plant community, an alternative that reduces hazard conditions will ensure recovery of this disturbed landscape without set-backs caused by wildland fire. No cumulative impacts or impairment would result from either alternative or wildland fire suppression.

Cultural resources

Archaeology

Alternative A -- No Action

Wildland fire has the potential for damaging artifacts, because its intensity heats the soil. This condition would be exacerbated by the presence of unmitigated hazard fuels. Foundations and unknown features would be endangered by wildland fire. Wildland fire suppression can result in damage to features and artifacts. Therefore, a lack of hazard mitigation may pose greater risk to archaeological resources.

Alternative B – Hazard Fuel Mitigation

Since unknown artifacts and features would lie at or beneath the soil surface, manual cutting of hazard fuels should not affect them. Vehicles for removing debris would remain on roads and trails and special attention would be given known features, such as foundations. Vegetation would be cut from around foundations to make foundations more visible, help to preserve the integrity of the materials, and mitigate hazard conditions, as needed. Burn piles would be ignited outside of sensitive areas, such as in the vicinity of foundations. The area around prospective piles would be examined for surficial or shallow artifacts (Jeff Richner, personal communication). As long as these precautions and those cited for protection of soils are taken for the protection of artifacts, no impact is expected. No direct, indirect, or cumulative adverse impacts are predicted from this alternative, because of mitigation.

Summary of Impacts

Neither of the proposed alternatives would adversely impact archaeological features or artifacts, given the precautions cited. The alternative that best reduces the risk of unwanted wildland fire, Alternative B, is preferred since unwanted wildland fire and its suppression have greater potential for affecting archaeological resources than treatment.

Unwanted wildland fires are often intense and have the capability of damaging glass, and clay artifacts and building foundations. Wildland fire suppression has a potential

to impact unknown archaeological features and artifacts, but allowing unwanted wildland fires to continue unsuppressed has greater potential for affecting archaeological values and resources. Building a fire line could result in damage to artifacts or features, but this would be avoided in both alternatives. Firefighters would use MIST at all times.

Upon completion of an archaeological base map and as research and surveys are completed, the FMP should be reviewed to ensure protection of archaeologically sensitive areas. No cumulative impacts are predicted and no impairment would occur under the proposed alternatives or wildland fire suppression, because of the mitigating precautions employed.

Cumulative Impacts

At this time, no actions stipulated in park planning impact the treatment area substantively. Alternatives in this document provide the tools to implement management of hazard fuels. The FMP is associated with the resource management sections of the GMP and would be considered during revisions of the encompassing plan. Any subsequent plans would include NEPA compliance, consideration of cumulative impacts, and public input and review, but no cumulative impacts are expected at this time. The FMP would undergo annual review and managers would amend it through the appropriate process as necessary.

The cumulative impacts analysis must also consider the actions of other private individuals, and community and governmental organizations in the vicinity. The cooperative nature of the park opens opportunities for the park to become familiar with plans and actions of other organizations in the Quincy Unit. Annual review of the FMP must consider neighboring organizations' new developments and planned actions.

Alternative A -- No action

This treatment may not meet the needs of hazard fuel management, potentially resulting in damage to resources if wildland fire occurs. Hazard fuel conditions may possibly develop over many years of no treatment, but this is a failure to meet the objective and not a cumulative impact. The continued buildup of hazard fuels, however, could result in catastrophic wildland fire. No costs are associated with this alternative.

Alternative B – Hazard Fuel Mitigation

No cumulative impacts are predicted at this time and all potentially negligible impacts are temporary, and so not cumulative. The only potential for cumulative impacts may be under the air quality topic. The presence of smoke from other fires combining with park emissions may have a cumulative impact. The park would seek a permit from the Michigan Department of Natural Resources prior to burning. The open burning permit would ensure that park actions would not be cumulative with those of neighbors in the vicinity, since issuance of a permit would depend on predictions of impact. The

infrequency of treatment would ensure that impact would not recur within the affective period. Therefore, this potential for cumulative impact is mitigated.

The flexibility of this treatment keeps costs within park budget, allows for effective disposal of debris, and allows the park to make on-the-ground decisions about the best management practices. The alternative is cost effective over time and the variety of techniques available allows for treatments to match funding available. No cumulative impacts or impairment of resources are predicted from this alternative.

Summary of Impacts

No substantive cumulative impacts are expected from either alternative. No impairment would occur under proposed alternatives or unwanted wildland fire suppression. Cumulative impacts are not expected from unwanted wildland fire or its suppression, because wildland fire is unlikely to repeat within the affective period. Unwanted wildland fire occurring on the parcel would result in a reassessment of fire management techniques with the intention of preventing another occurrence.

Impairment

Neither of the proposed alternatives would have significant impacts on any resources on or off the park, directly, indirectly, or cumulatively. There would be no impairment of any resource on the park and both of the alternatives could contribute to the preservation and protection of resources and mission of the park.

Fire suppression is not expected to substantively impact resources. Firefighters would employ MIST and minimize fire line creation. Direct effect of wildland fire would have greater impact than fire suppression. Although the park has not identified values on the parcel, unwanted wildland fire could damage the existing exposed foundations on the site. If a wildland fire occurred, it may have the potential to damage or even impair historic values of cultural sites. This strengthens the argument that unwanted wildland fire must be prevented using the best alternative available.

Conclusions

Using manual hazard fuel mitigation would best meet the goals for fire management with the least potential for impact. No lasting measurable impacts in any of the topics considered would occur with this alternative. Unwanted wildland fire must be prevented to assure the best protection of all resources in the park and adjacent private lands. The best management of hazard fuels plays an important role in determining the environmentally preferred alternative.

Therefore, Alternative B, Hazard Fuel Mitigation, is the preferred alternative and the environmentally preferred alternative.

Chapter 5 -- Coordination and Consultation

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List of Acronyms

CEQ	Council on Environmental Quality, council that develops guidance followed by EPA and other agencies in implementing NEPA and other environmental regulations
EA	Environmental Assessment, this document, assessment of impacts from an action
EIS	Environmental Impact Statement, assessment of impacts, when impacts may be controversial or of greater magnitude, using data and information collected for the decision making process
EPA	Environmental Protection Agency, lead agency in environmental compliance in air quality, water quality, NEPA, and several other issues
FMP	Fire Management Plan, document that describes the use of fire in management and protection of resources, also includes information on fire suppression
GMP	General Management Plan, planning document that sets NPS facility themes and desired future conditions, while recommending general means of achieving desired future conditions
GPRA	Government Performance Results Act of 1993, legislation intended to make federal agencies accountable for results based on mission; results in a multi-year Strategic Plan and annual Work Plan
MIST	Minimum Impact Suppression Tactics, documented in NPS Reference Manual 18, minimize impacts on resources during fire suppression
NEPA	National Environmental Policy Act of 1969 (as amended in 1975), federal regulation guiding consideration of the human environment in planning and actions
NPS	National Park Service, U.S. Department of Interior
park	Keweenaw National Historical Park
PM	Particulate matter, air quality standard for particulates at 10 micrometer diameter and 2.5 micrometer diameter
RMP	Resource Management Plan, NPS planning document nested within the GMP and addressing issues of cultural and natural resource management and protection

Figure 1: Relative Location of Quincy Unit Wildland Parcel

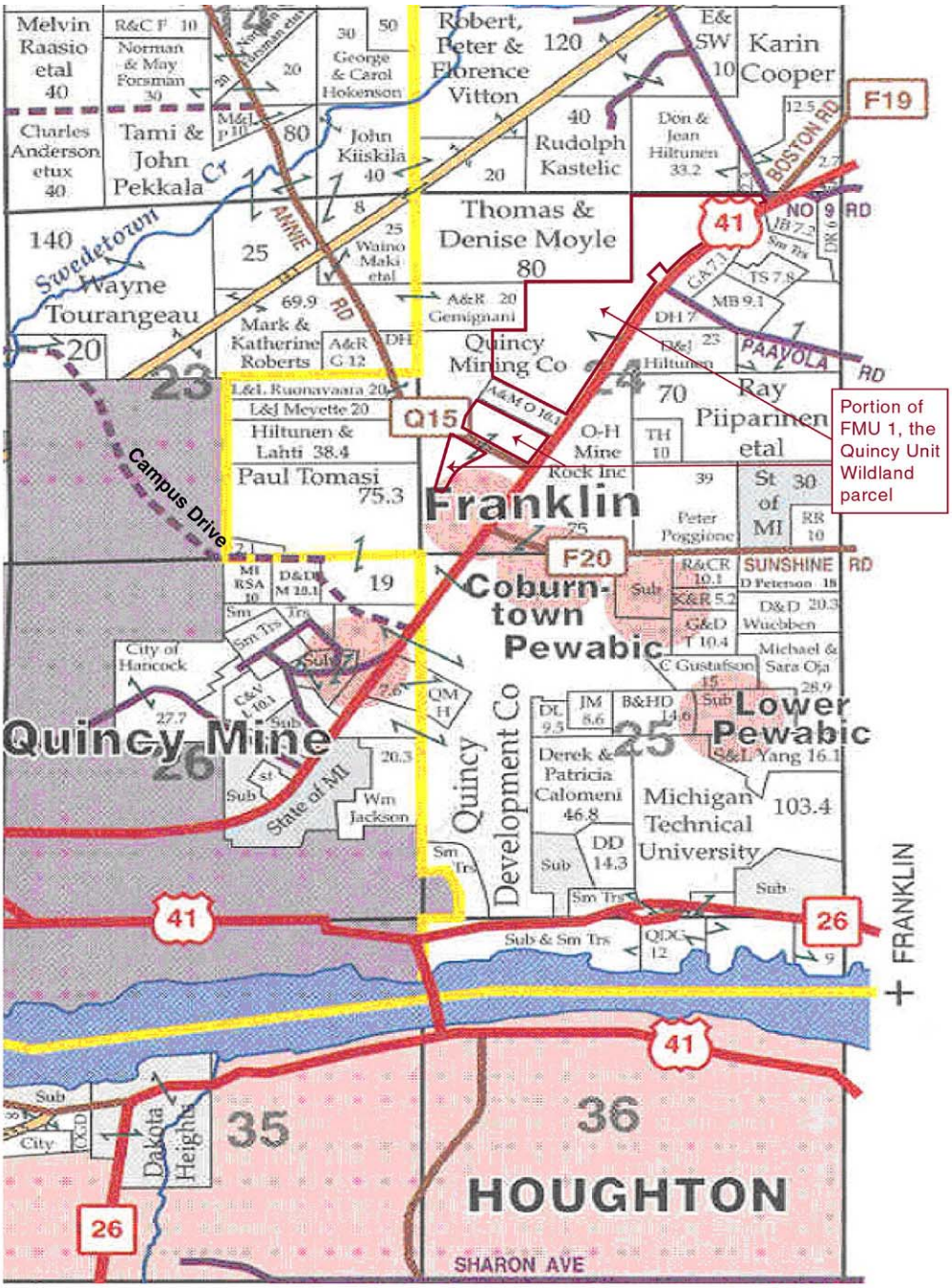

Figure 2: Quincy Unit Wildland Parcel Topography

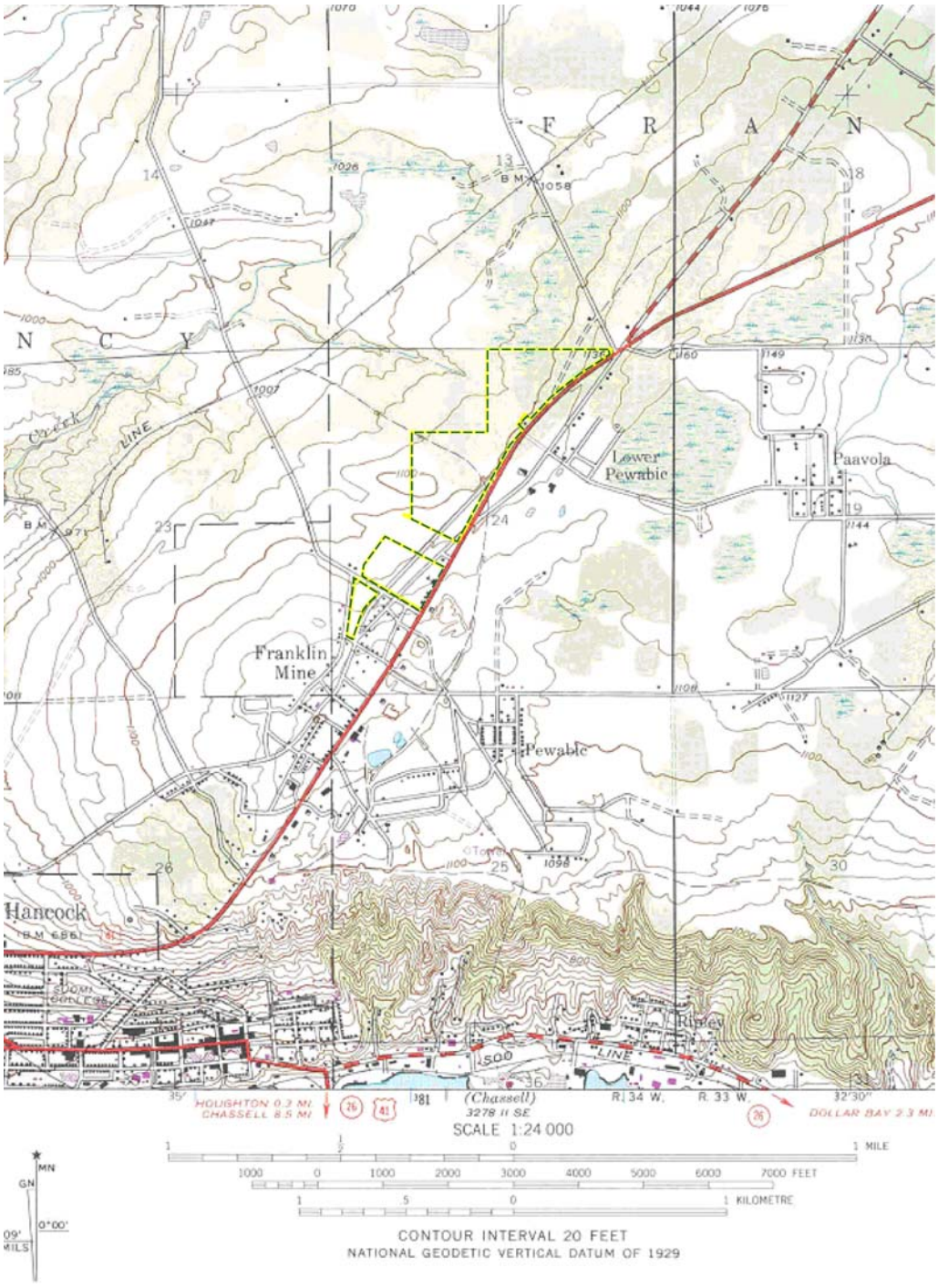

Figure 3: Vegetation Types within the Quincy Unit Wildland Parcel

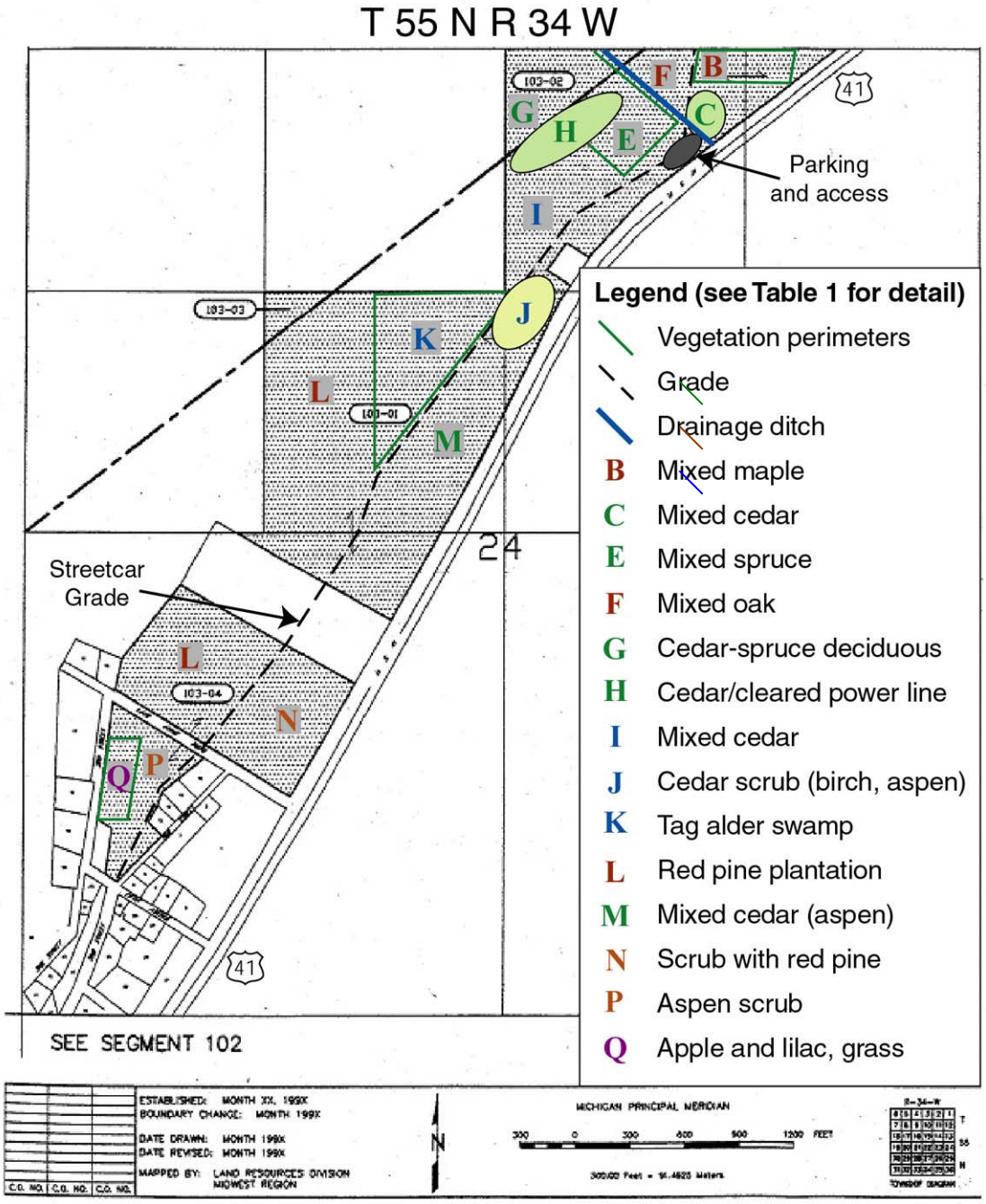

Table 2: Description of General Vegetation Types

(To be used with Figure 3)

Vegetation type	Description
B	Mid-story saplings under mixed maple/hardwood of 6-12” DBH, few small fir
C	Cedar interspersed throughout wet area, sparse
E	Spruce (about 40 ft. height) among mixed deciduous
F	Mixed oak forest with some open grown oaks, small American elm and sugar maple beneath
G	Cedar with evenly mixed spruce, oak, maple
H	Cedar along power line right-of-way clearing (power line cleared 30-50 meters wide)
I	Cedar with mixed deciduous
J	Cedar with scrub paper birch, aspen with some red osier dogwood on south
K	Tag alder swamp with aspen on uplands
L	Red pine plantation (20 years + or – and 30-40 feet)
M	Cedar mix with aspen
N	Scrub wood and 20 foot red pine
P	Aspen scrub
Q	Old home site with apple trees and lilac bushes in grass ground cover

Grades without culverts act as dams throughout area, creating standing water. A drainage-ditch extends northwest between stands E and F.

Figure 4: Photographs of parcel

Example of a fire break located on the west side of the parcel, although not on parcel borders. Vegetation is type-H and type-I. (Photos taken in April)

Example of standing water retained by road grade. Vegetation is type-C.

Traction Company grade in southern section, looking north. Vegetation is type-J.

Foundation of school. Vegetation is type-N.

Swamp lies 20 meters from point of photograph. Vegetation is type-K.

Open Burning Laws, State of Michigan

R 336.1310 Open burning.

Rule 310.

(1) A person shall not cause or permit open burning of refuse, garbage, or any other waste materials, except for the burning of any of the following:

(a) Waste disposal material from and at 1- or 2-family dwellings if the burning does not violate any other department rules.

(b) Structures and other materials used exclusively for fire prevention training.

(c) Trees, logs, brush, and stumps in accordance with applicable state and local regulations if the burning is not conducted within a priority I area as listed in table 33, a priority II area as listed in table 34, nor closer than 1400 feet to an incorporated city or village limit and if the burning does not violate any other department rules.

(d) Beekeeping equipment and products, including frames, hive bodies, hive covers, combs, wax, and honey, if burned for bee disease control.

(e) Logs, brush, charcoal, and similar materials that are used in preparing food or for recreation.

(2) The exceptions specified in subrule (1) of this rule do not authorize open burning if prohibited by local law or regulation.

History: 1979 ACS 1, Eff. Jan. 19, 1980; 1999 MR 1, Eff. Feb. 4, 1999.